

Brittle diabetes in the elderly

Susan J Benbow MD FRCP^{1,2} Angela Walsh RGN² Geoffrey V Gill MD FRCP^{1,2}

J R Soc Med 2001;94:578–580

SUMMARY

Severely unstable, or brittle, diabetes can be disruptive to patients, carers and diabetes care teams. The peak age-group for brittle diabetes is 15–30, but there are reports of its occurrence in much older patients. To explore the characteristics and cause of brittle instability perceived by diabetologists in elderly patients we circulated a questionnaire to all UK hospital diabetic clinics for adults. 130 (56%) of 231 replied. Reports were obtained on 55 patients fulfilling our criteria for ‘elderly brittle diabetes’—namely, age ≥ 60 years, on insulin treatment, and experiencing life-disrupting glycaemic instability of any kind associated with frequent or long admissions to hospital. Further information was obtained by a research nurse who visited the relevant clinics.

The mean age of patients was 74 years (range 60–89) and 71% were female. The brittleness was classed as mixed glycaemic instability in 22 (44%), recurrent ketoacidosis in 16 (29%) and recurrent hypoglycaemia in 15 (27%). In 2 cases there was insufficient information for classification. The diabetes care team judged the brittleness to have multiple origins in two-thirds of the cases: problems with memory or behaviour were rare, and in only 4 cases was deliberate manipulation of therapy considered a possibility. 84% of the patients were living independently.

In younger patients the principal manifestation of brittle diabetes is recurrent ketoacidosis. The present survey, though possibly subject to ascertainment bias, indicates that the patterns of instability and their causation may be different in elderly patients. With the growing use of insulin in the elderly, brittle diabetes is likely to be encountered increasingly often in this age-group.

INTRODUCTION

The term brittle has been applied for several decades to patients with severely unstable type 1 diabetes^{1–3}. Such patients tend to defy all attempts at orthodox glycaemic control and the condition disrupts the lives of themselves, their relatives and their healthcare teams^{4,5}. Recurrent and long hospital admissions are the rule^{1,5,6}. Most patients with brittle diabetes are in the second or third decade of life^{7,8}, and they are typically admitted with ketoacidosis (DKA) rather than hypoglycaemia or mixed patterns of instability^{7–9}. Griffiths and colleagues have reported 6 older patients with brittle type 1 diabetes¹⁰. Also, in a national UK hospital-based survey of brittle diabetes, Gill and Lucas showed that there was a ‘second peak’ of prevalence at age 60–70 years, though much smaller than the main peak at 15–30⁷. Neither of these groups examined in detail the characteristics and potential causation of elderly brittle diabetes, and in view of this, we undertook a detailed investigation of patients reported with this condition from diabetic clinics in the UK.

METHODS

Using lists of consultant physicians and geriatricians running diabetic clinics in the UK held at Diabetes UK (formerly the British Diabetic Association), we circulated a questionnaire enquiring about patients with elderly brittle diabetes, defined as follows: aged 60 years or over; insulin-treated; glycaemic instability of any type leading to life disruption; recurrent and/or lengthy hospital admissions. This definition was adapted from other studies on brittle diabetes^{3,6}. The questionnaire, which was kept very simple to encourage cooperation, requested age and sex of any elderly brittle patients in the clinic, their type of glycaemic instability (recurrent ketoacidosis, recurrent hypoglycaemia, or mixed brittleness), and possible causes for instability. A repeat mailing was sent to clinics who did not respond within 2 months. After a positive response, and with the individual consultant’s permission, a research nurse visited the hospital concerned to record further details from the case notes and to interview professionals involved with the patient’s care.

Numerical data were expressed as means and standard deviation or as percentages of groups. Differences between groups were tested for statistical significance by *t* tests or χ^2 tests.

¹University Clinical Department of Medicine, University Hospital Aintree, Liverpool L9 1AE; ²Diabetes Centre, Walton Hospital, University Hospital Aintree, Liverpool L9 1AE, UK

Correspondence to: Dr G V Gill
E-mail: g.gill@liv.ac.uk

RESULTS

231 questionnaires were circulated and 130 were returned (response rate 56%). 24 clinics gave information on 55 patients fulfilling the criteria for elderly brittle diabetes and the research nurse visited the hospitals of all but 4. The patients' mean age was 74 years (range 60–89). 16 were in the age band 60–70, 27 in the age band 71–80, and 12 over 81. 39 (70%) were female. Mean duration of diabetes was 24 years (range 3–60) and mean duration of brittle behaviour was 9 years (1–20).

Case-note examination of admission characteristics showed that 22 (44%) had mixed brittleness, 16 (29%) recurrent DKA and 15 (27%) recurrent hypoglycaemia. In 2 cases there was insufficient information for accurate classification. In the mixed brittle group the male/female ratio was 5/19, in the recurrent DKA group it was 4/12, and for those with recurrent hypoglycaemia it was 7/8. These differences were not statistically significant.

In 33 patients (66%) the diabetes-care team considered the causes multiple. Single causes included medical disease in 7 (14%) and hypoglycaemic unawareness in 3 (6%). Memory or behavioural problems were judged the major cause of brittleness in only 4 (8%) cases, though a possible contributing factor in a further 11. There was no obvious cause in 3 patients. In 4 cases there was some suggestion of deliberate manipulation of diabetes control: 2 with recurrent DKA were thought to be attention-seeking by omitting insulin; 1 with recurrent hypoglycaemia had marital problems and possible depression, and there was suspicion of personal gain from her diabetic instability; and the fourth, also a woman with recurrent hypoglycaemia, was thought to be depressed and manipulative (all her hypoglycaemic attacks had recurred in public places). But in all of these 4 cases there were other possible contributory factors to instability—notably, chronic non-diabetic medical disease.

24 patients lived with spouses or other relatives, 22 lived alone and 9 were in residential care. There was no relationship between the type of accommodation and classification of brittle behaviour. 32 gave their own insulin, 21 were given insulin by a relative or district nurse, and 2 were on a continuous insulin infusion (CSCII). The most common regimen (18) was a twice-daily premix (usually 30:70). Others included four times daily 'basal:bolus' (14), twice-daily free-mixed insulin (3) and subcutaneous insulin infusion pumps (2). 18 were on various other regimens, including thrice daily soluble, twice daily isophane, and once daily intermediate-acting insulins.

DISCUSSION

Our study was not aimed to assess the prevalence of brittle diabetes in the elderly, but simply to investigate the

condition as a perceived problem amongst hospital diabetic clinics and to examine patient characteristics. We obtained a moderate questionnaire response rate of 56%, and it is likely that clinics with elderly brittle patients would be more disposed to respond. An ongoing problem with studies of brittle diabetes also concerns definition of the condition, which is necessarily subjective. We based our definition on the principal features of life disruption and recurrent hospital admission, which have been used extensively by ourselves and others^{4–8}.

Our results indicate that brittle diabetes in the elderly exists, and is troublesome to those involved with these patients. This is demonstrated by the fact that in 2 of our study patients treatment was with CSCII, other standard insulin systems having failed. CSCII is a problematic system of insulin delivery, seldom used in the elderly¹¹.

Elderly brittle patients have varying reasons for admission, and the most common subgroup was 'mixed brittleness'. This is in contrast to studies in younger groups where recurrent DKA is usually the commonest (about 60%) form of instability⁸. Also, some studies in younger patients have shown a greater female excess than ours^{5,12}, though this is not always a clear finding⁷—thus our figure of 71% female is not unlike the figure of 66% female in the large survey ($n=414$) by Gill *et al.*⁷. The female excess in elderly brittle patients should not be interpreted too far, since there is a female excess in the elderly population in general. Underlying aetiological factors in our study were generally inconsistent, but cognitive behavioural problems seemed important in several cases.

There is little published information on unstable diabetes in the elderly. A previous study of patients with recurrent episodes of DKA at all ages, in Birmingham, UK¹³, showed that, of 39 patients with more than three episodes of DKA in a 4-year period, 10 (25%) were over 59 years of age. The authors noted that all these patients had other chronic diseases and some were socially isolated. Griffith and Yudkin, in their report of 6 patients with 'elderly brittle' diabetes, found most to have mixed types of brittleness, and 5 of the 6 were female. There were no clear reasons for the instability¹⁰. Finally, Gale and colleagues from Nottingham in 1981 reported that, over a 7-year period, one-third of diabetic patients admitted because of hyperglycaemic poor control were over 50 years of age.

Diabetes in general is important in the elderly^{15,16}. It is common, and though most have type 2 diabetes, insulin treatment may be necessary. Increasing numbers of type 1 patents are also surviving to old age, and new type 1 diabetes can develop in old age¹⁷. Coexisting diseases and social factors can affect delivery of care and control¹⁸, and the mortality of acute diabetic metabolic decompensation (particularly hyperglycaemic) is higher in the elderly than in the young^{19,20}. The prevention and management of

brittle diabetes in the elderly is likely to require a multidisciplinary approach involving diabetes physicians and specialist nurses, as well as geriatric medicine and primary care specialists.

REFERENCES

- 1 Gill GV, Williams G. Brittle diabetes. In: Alberti KGMM, Zimmet P, DeFronzo RA, eds. *International Textbook of Diabetes*, 2nd edn. Chichester: Wiley, 1997:1123–33
- 2 Williams G, Pickup JC. Problems with metabolic control in insulin-dependent diabetes mellitus. In: Pickup JC, Williams G, eds. *Textbook of Diabetes*, 2nd edn. Oxford: Blackwell Science, 1997:36.1–36.18
- 3 Tattersall RB. Brittle diabetes revisited: the 3rd Arnold Bloom Memorial Lecture. *Diab Med* 1997;**14**:99–110
- 4 Tattersall R. Brittle diabetes. *Clin Endocrinol Metab* 1977;**6**:403–19
- 5 Gill GV, Husband DJ, Walford S, Marshall SM, Home PD, Alberti KGMM. Clinical features of brittle diabetes. In: Pickup JC, ed. *Brittle Diabetes*. Oxford: Blackwell Science, 1985:29–40
- 6 Kent LA, Gill GV, Williams G. Mortality and outcome of patients with brittle diabetes and recurrent ketoacidosis. *Lancet* 1994;**334**:778–81
- 7 Gill GV, Lucas S, Kent LA. Prevalence and characteristics of brittle diabetes in Britain. *Q J Med* 1996;**89**:839–43
- 8 Gill GV. The spectrum of brittle diabetes. *J R Soc Med* 1992;**85**:259–61
- 9 Tattersall R, Gregory R, Selby C, Kerr D, Heller S. Course of brittle diabetes: a 12 year follow-up. *BMJ* 1991;**302**:1240–3
- 10 Griffiths DNW, Yudkin JS. Brittle diabetes in the elderly. *Diab Med* 1989;**6**:440–3
- 11 Egger M, Davey-Smith G, Shettler C, Diem P. Risk of adverse effects of intensified treatment in insulin-dependent diabetes mellitus: a meta analysis. *Diab Med* 1997;**14**:919–28
- 12 Pickup J, Williams G, Johns P, Keen H. Clinical features of brittle diabetic patients unresponsive to optimised subcutaneous insulin therapy (continuous subcutaneous insulin infusion). *Diabetes Care* 1983;**6**:279–84
- 13 Chapman J, Wright AD, Nattrass SM, Fitzgerald MG. Recurrent diabetic ketoacidosis. *Diab Med* 1988;**5**:659–61
- 14 Gale EAM, Dornan TL, Tattersall RB. Severe uncontrolled diabetes in the over-fifties. *Diabetologia* 1981;**21**:25–8
- 15 Tattersall RB. Diabetes in the elderly—a neglected area? *Diabetologia* 1984;**27**:167–73
- 16 Meneilly GS, Tessier D. Diabetes in the elderly. *Diab Med* 1995;**12**:949–60
- 17 Kilvert A, Fitzgerald MG, Wright AD, Nattrass M. Newly diagnosed insulin-dependent diabetes mellitus in elderly patients. *Diab Med* 1984;**1**:115–18
- 18 Benbow SJ, Walsh A, Gill GV. Diabetes in institutionalised elderly people: a forgotten population? *BMJ* 1997;**314**:1868–9
- 19 Flack JR, Yue DK. Acute complications of diabetes in elderly patients. In: Finucane P, Sinclair AJ, eds. *Diabetes in Old Age*. Chichester: Wiley, 1995:93–105
- 20 Malone ML, Gennis V, Goodwin JS. Characteristics of diabetic ketoacidosis in older versus younger adults. *J Am Geriatr Soc* 1992;**40**:1100–4